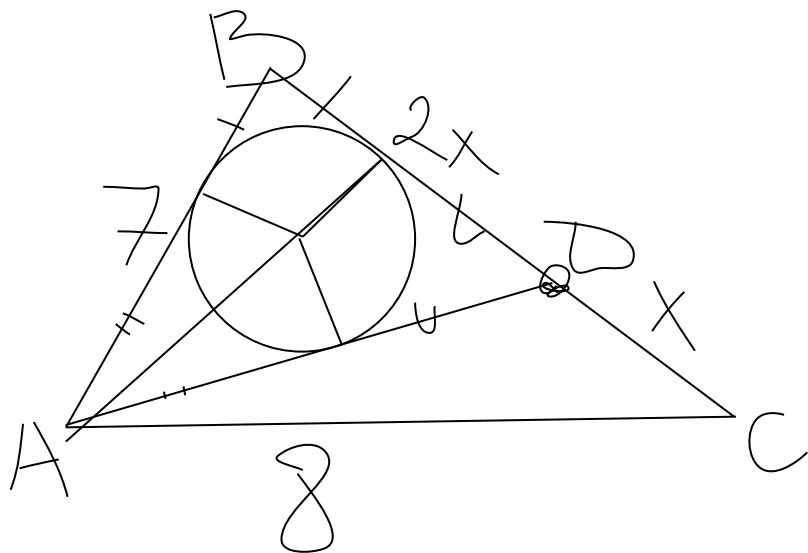


В тр ABC известны стороны $AB=7$, $AC=8$ и $\cos(\angle BAC)=11/16$. На стороне BC выбраны точка D так, что $DC/BC=1/3$. Найти радиус окр-ти, вписанной в тр ABD



$$\cos \angle BAC = 11/16$$

$$DC/BC = 1/3$$

$$BC^2 = AB^2 + AC^2 - 2AB \cdot AC \cdot \cos \angle BAC = 49 + 64 - 112 \cdot 11/16 = 36$$

$$BC = 6$$

$$x = 6/3 = 2$$

$$\cos \angle C = (BC^2 + AC^2 - AB^2) / (2BC \cdot AC) = (36 + 64 - 49) / (2 \cdot 6 \cdot 8) = 51/96 = 17/32$$

$$AD^2 = 4 + 64 - 32 \cdot 17/32 = 51$$

$$AD = \sqrt{51}$$

$$\cos \angle B = (49 + 16 - 51) / 56 = 14/56 = 7/28 = 1/4$$

$$\sin \angle B = \sqrt{1 - 1/16} = \sqrt{15/16} = \sqrt{15}/4$$

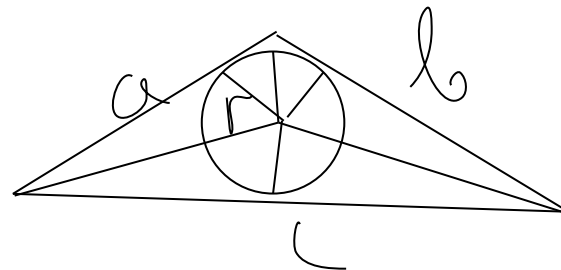
$$S = BD \cdot \sin \angle B \cdot AB / 2 = 4 \cdot \sqrt{15} \cdot 7/8 = 7\sqrt{15}/2$$

$$7\sqrt{15}/2 = r(7 + 4 + \sqrt{51})/2$$

$$7\sqrt{15}/2 = r(11 + \sqrt{51})/2$$

$$r = 7\sqrt{15} / (11 + \sqrt{51}) = 7\sqrt{15}(11 - \sqrt{51}) / (121 - 51) = (77\sqrt{15} - 7\sqrt{765}) / 70 = (11\sqrt{15} - 3\sqrt{85}) / 10$$

$$\text{Ответ: } (11\sqrt{15} - 3\sqrt{85}) / 10$$



$$S = r(a + b + c) / 2$$